

REMARKS

By this Amendment, claims 18-47 will be pending. Claims 18, 19, 20, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33 and 34 were amended, claims 31 and 35-37 were cancelled and claims 38-47 were added to more fully claim the invention as originally disclosed. Further, Applicants submit that an Abstract was provided on a separate sheet in the March 18, 2002 Supplemental Preliminary Amendment. Nonetheless, Applicants have amended that Abstract of the Disclosure to better conform with the subject matter recited in claims 18-47 and have attached the Abstract hereto on a separate sheet. Neither the addition of claims 18-37 nor the amendments to the Abstract of the Disclosure add new matter. Reconsideration and allowance of the present application based on the following remarks is respectfully requested.

Applicants have amended the title to be more descriptive, as suggested by the Office Action.

Claims 20, 33 and 36 were objected to due to various informalities noted by the Office Action. Applicants have amended claims 20 and 33, as the Office Action suggested, and cancelled claim 36.

Claims 18-37 were rejected under 35 U.S.C §102(b) over Hiyama et al. (U.S. Patent No. 5,436,655). With respect to claims 31 and 35-37, this rejection is moot because of the cancellation of those claims. With respect to claims 18-30 and 32-34, this rejection is respectfully traversed because Hiyama et al. does not disclose every feature recited in the rejected claims.

For example, Hiyama et al. does not disclose a small-sized light source unit that comprises a plurality of small-sized LEDs and a compounding optical system configured to compound light emitted by the plurality of small-sized LEDs, as recited in independent claim 30 (and dependent claims 32-34). Further, Hiyama et al. does not disclose a TV observation system for an endoscope that comprises, among other elements, a small-sized light source unit comprising a plurality of small-sized LEDs and a compounding optical system configured to compound light emitted by the plurality of small-sized LEDs, as recited in independent claims 18 and 25 (and dependent claims 19-24 and 26-29).

Hiyama et al. is directed to an endoscope apparatus for 3D measurement in which a lamp emits light used for illumination and another light emitting device, typically a laser or LED, emits light used for measuring. Each embodiment of Hiyama et al., as shown in FIGS. 6, 8, 18, 21, 45, 46, 66 and 76, discloses a lamp for generating white light used for the

illumination and a condenser lens system used to condense the light emitted from the lamp. The white light emitted by the lamp can be color filtered before passing through the condenser lens system, however, Hiyama et al. does not disclose, nor would it be obvious, to replace the lamp with one or more LEDs. Hiyama et al. does not disclose an endoscope apparatus that comprises a small-sized light source unit that comprises a plurality of small-sized LEDs, as recited in independent claims 18, 25 and 30. Further, Hiyama et al. does not disclose an endoscope apparatus that comprises a small-sized light source unit that comprises a compounding optical system configured to compound light emitted by the plurality of small-sized LEDs, as recited in independent claims 18, 25 and 30 (and dependent claims 19-24, 26-29 and 32-34).

Dependent claims 19-24, 26-29 and 32-34 are allowable for at least the reasons set forth above with respect to respective independent claims 18, 25 and 30, and for the additional reason that each dependent claim recites additional patentable subject matter.

Accordingly, reconsideration and withdrawal of the rejection of claims 18-30 and 32-34 is respectfully requested.

In view of the foregoing, the claims are now believed to be in form for allowance, and such action is hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

Attached hereto is a marked-up version of the changes made to the specification and claims by the current amendment. The attached Appendix is captioned **"Version with markings to show changes made"**.

Respectfully submitted,

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Enclosure: Appendix

APPENDIX

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE TITLE:

The title is changed as follows:

TV OBSERVATION SYSTEM FOR ENDOSCOPES INCLUDING A LIGHT
SOURCE UNIT HAVING LEDS

IN THE CLAIMS:

Please cancel claims 31 and 35-37 without prejudice or disclaimer.

Please amend the following claims:

18. (Amended) A TV observation system for an endoscope comprising:

an endoscope; and

a small-sized light source [including a combination of a plurality of light emitting elements;] unit,

[a power supply configured to supply electric power to said light source;

a light transmitter configured to transmit light from said light source to a distal end of an endoscope; and]

wherein said endoscope is structurally separated into an insertion part and a proximal holding part continuously extending from said insertion part,

wherein said endoscope comprises a light guide arranged from a distal end of said insertion part through said proximal holding part,

wherein said proximal holding part is provided with a light guide joint section where an entrance end face of said light guide is fixed,

wherein said small-sized light source unit is constructed and arranged to be removably connected with said light guide joint section, and

wherein said small-sized light source unit comprises a plurality of small-sized LEDs and a compounding optical system configured to compound light [having different emission spectral bands from] emitted by said plurality of [light emitting elements, wherein at least one of said light source, said power supply and said compounding optical system is disposed adjacent to the endoscope so that light transmitted through said compounding optical system is supplied to said light transmitter] small-sized LEDs.

19. (Amended) A TV observation system for an endoscope according to claim 18, wherein [each of] said [light emitting elements is a] plurality of small-sized [light emitting element having a narrow emission spectral band] LEDs are LEDs that emit light having wavelength bands of red, green and blue, respectively, and wherein said light compounding optical system compounds the light having wavelength bands of red, green and blue and combines paths of the light having wavelength bands of red, green and blue into a single path.

20. (Amended) A TV observation system for an endoscope according to claim 19, wherein said small-sized light source unit further comprises a mechanism configured to control electric currents applied to said [light emitting elements are controlled] small-sized LEDs so that amounts of light emission of said [light emitting elements] small-sized LEDs are set in a desired ratio for color control of compounded light [as compounded by said light compounding optical system] or so that said [light, emitting elements] small-sized LEDs sequentially emit light.

22. (Amended) A TV observation system for an endoscope according to claim 19, wherein said compounding optical system includes a planar glass plate configured to diffuse light [having light diffusing effect].

23. (Amended) A TV observation system for an endoscope according to claim 22, wherein said planar glass plate has a fine pattern engraved on a surface thereof to [use] compound light emitted by said small-sized LEDs by using a diffraction effect.

24. (Amended) A TV observation system for an endoscope according to claim 23, wherein said planar glass plate is disposed [adjacent to an entrance end face of said light transmitter] in said light guide joint section and is used as a cover glass configured to protect [said] a light transmitter.

25. (Amended) A TV observation system for an endoscope [according to claim 18,] comprising:
an endoscope;

a small-sized light source unit; and
an attachment TV camera,
wherein said endoscope is structurally separated into an insertion part and a proximal holding part continuously extending from said insertion part,
wherein said endoscope comprises a light guide arranged from a distal end of said insertion part through said proximal holding part,
wherein said proximal holding part is provided with a light guide joint section where an entrance end face of said light guide is fixed,
wherein said proximal holding part is provided with an eyepiece section, on which said attachment TV camera is constructed and arranged to removably mount,
wherein a photographing lens, an image sensor, and said small-sized light source unit [, said power supply and said compounding optical system] are arranged in [an] said attachment TV camera [constructed and arranged to removably mount on the endoscope], and
wherein said small-sized light source unit includes a plurality of small-sized LEDs, a compounding optical system configured to compound light emitted by said plurality of small-sized LEDs, and a battery.

26. (Amended) A TV observation system according to claim 18, further comprising an attachment TV camera, wherein said [light source and said compounding optical system are arranged in the endoscope and said power supply is arranged in an] attachment TV camera is constructed and arranged to removably mount on [the endoscope] an eyepiece section arranged in said proximal holding part, and wherein a photographing lens, an image sensor, and a battery for supplying a power to said light source unit are arranged in said attachment TV camera.

27. (Amended) A TV observation system according to claim 18, further comprising an attachment TV camera and a TV processor, wherein said [light source and said compounding optical system are arranged in an] attachment TV camera is constructed and arranged to removably mount on [the endoscope, said power supply is arranged in a TV processor which displays electric signals from said TV camera, and a power line is arranged, along with a signal cable of said TV camera, to connect said attachment TV camera and said TV processor] an eyepiece section arranged in said proximal holding part, wherein said TV

processor is arranged separate from said endoscope, and wherein a photographing lens, an image sensor, and a battery for supplying a power to said light source unit are arranged in said TV processor.

28. (Amended) A TV observation system for an endoscope according to claim [18] 25, wherein said small-sized light source unit [and said compounding optical system are connected with a joint section of the endoscope provided for said light transmitter, wherein the power supply is incorporated in a TV processor that displays electric signals from an attachment TV camera, and wherein said light source and said compounding optical system are connected with said power supply via] is constructed and arranged to removably mount said attachment TV camera.

29. (Amended) A TV observation system for an endoscope according to claim 25, wherein said small-sized light source unit [, said power supply and said compounding optical system form an assembly that is constructed and arranged to removably mount on said attachment TV camera] further comprises a mechanism configured to control electric currents applied to said small-sized LEDs so that amounts of light emission of said small-sized LEDs are set in a desired ratio for color control of compounded light or so that said small-sized LEDs sequentially emit light.

30. (Amended) A small-sized light source unit comprising:
[a light source including a combination of] a plurality of [light emitting elements] small-sized LEDs;

[a power supply configured to supply electric power to said light source;] and
a compounding optical system,
wherein said compounding optical system is configured to compound light emitted by
said plurality of [light emitting elements] small-sized LEDs,

wherein said plurality of small-sized LEDs are disposed to oppose an entrance surface
of said compounding optical system,

wherein said plurality of small-sized LEDs emit monochromatic light having narrow
wavelength spectral bands of red, green and blue, respectively, and

wherein said small-sized light source unit is constructed and arranged to removably mount on a light guide joint section that is arranged in a proximal handling part of an endoscope.

32. (Amended) A small-sized light source unit according to claim 30, further comprising a mechanism configured to control electric currents applied to said [light emitting elements are controlled] small-sized LEDs so that amounts of light emission of said [light emitting elements] small-sized LEDs are set in a desired ratio for color control of compounded light [as compounded by said light compounding optical system] or so that said [light emitting elements] small-sized LEDs sequentially emit light.

33. (Amended) A small-sized light source unit according to claim 30, wherein said compounding optical system includes a prism assembly having two right-angled prism elements cemented together to form a cube and an interface of the two prism elements is processed with a band-pass coat which transmits [rage] rays having predetermined wavelengths and reflects remaining rays.

34. (Amended) A small-sized light source unit according to claim 30, wherein said compounding optical system includes a planar glass plate configured to diffuse light [having diffusing function].

Claims 38-47 are added.

IN THE ABSTRACT OF THE DISCLOSURE:

The abstract attached herewith as a separate sheet is changed as follows:

ABSTRACT OF THE DISCLOSURE

[A TV observation system for endoscopes has an illumination system including a light source configured to emit light to illuminate an object to be observed and a light transmitter configured to transmit the light from the light source to a distal end of the endoscope. The TV observation system also includes a power supply configured to supply electric power to the light source and a compounding optical system configured to compound light having different emission spectral bands from the light source. At least one of the light source, the

power supply and the compounding optical system is disposed adjacent to the endoscope so that light transmitted through the compounding optical system is supplied to the light transmitter] A TV observation system for an endoscope including an endoscope and a small-sized light source unit. The endoscope can be structurally separated into an insertion part and a proximal holding part continuously extending from the insertion part. The endoscope can comprise a light guide arranged from a distal end of said insertion part through said proximal holding part. The proximal holding part can be provided with a light guide joint section where an entrance end face of said light guide is fixed. The small-sized light source unit can be constructed and arranged to be removably connected with the light guide joint section. The small-sized light source unit includes a plurality of small-sized LEDs and a compounding optical system configured to compound light emitted by the plurality of small-sized LEDs.